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ABSTRACT

The need for increased industrial productivity has become great in American society. If America is not to be outstripped by foreign competitors, worker productivity must be increased. Industrial arts can play a part in increasing productivity by fostering productive ideas in students. Attempts at work redesign have led to short-term increases in productivity but have not always led to sustained productivity improvement. Since attempts at attitude improvement in workers do not always continue after an innovative approach, new priorities should be set for industrial education. There should be a thrust for research in methods of quality of working life and for strategies to develop the awareness and skills in youth necessary to function in the roles required in industry for improving productivity. Somewhere in the background of the American work force there needs to be educational experiences that are designed to develop the skills of productive thinking. Students can be made conscious of their power to produce ideas and their power to convert ideas to products that form the content of this world. People can be taught to make incremental improvements in their productive thinking abilities. Two techniques used in workshops to increase productive thinking are the "Golden Touch Techniques" and the Semantic Interdisciplinary and Combination of Reality Factors Technique. Use of these techniques in industrial arts can help students to improve their thinking and contribute to industrial productivity. (KC)

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PRODUCTIVITY, A PRIORITY

FOR

INDUSTRIAL ARTS

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by

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PRODUCTIVITY, A PRIORITY FOR INDUSTRIAL ARTS

President Reagan, as well as leaders of the opposing party, repeatedly declare that the top national priority is the stopping of our declining productivity. At the heart of this priority is our survival, the survival of industries, our standard of living, jobs and our economy. We have already witnessed the loss of leadership in a number of key industries including automotives, shipping, steel, machine tools, electronics industries and, shockingly, in management techniques. The problem was dramatized on the recent NBC television documentary entitled, "If Japan Can, Why Can't We?" Narrator Lloyd Dobbins stated:

> "Unless we solve the problem of productivity, our children will be the first generation of Americans to live worse than their parents."

This serious issue of productivity impinges upon the role and expectations for Industrial Arts education. American workers, companies, national labor unions, are increasingly making concessions necessary to save industry by foregoing pay increases, benefits and taking pay reductions. Concurrently, many industrial educators are promoting the developmental concepts of the late fifties, such as fostering the self-concept which contributed to the phenomena referred to as the "now" and "me generation." The impulse for self absorption and self indulgence needs no nutrition from industrial educators. The continuous demand for salary increases, the equating of achievement with money without due consideration of the impact on others such as the health and future of the company that pays them, make it difficult for a company to reinvest its profits into modern production methods. The concept of increasing productivity in the perception of self absorbed workers in the best kind of setting connotes "working harder" and "management exploitation." An employer speaking to leaders of industries stated, "give me a person full of productive ideas, not one who is full of himself." Accordingly, where do we get produc-

tive ideas? How are they generated? What can Industrial Arts practitioners do to effectively contribute to the responsibilities of productivity? What thinking behaviors should students experience in our laboratories to function in the new Quality of Working Life (Q.W.L.) programs employed in industry?

The issues addressed at this conference provides evidence that as a profession we are making incremental progress toward good programs to interface the needs of youth with those of industry. One underlying dimension of productivity addressed in this paper is the process of thought or "mentafacturing." (KRIEGBAUM, 1983) I propose to describe what I am doing in one basic facet of productivity which is the development of productive, innovative thinking abilities. I believe that unless we teach and provide experiences to our children in the art of productive thinking, "generations of Americans will truly live worse than their parents."

Ted Mills, founder of the American Center for the Quality of Working Life (Q.W.L.), states that to improve productivity in an industrial setting, one must consider elements that make up the quality of the working life. He indicates that Q.W.L. is an attempt "to provide people at work (managers, supervisors, rank and file workers) with structured opportunities to become actively involved in a new interpersonal process of problem solving toward both a better way of working and a more effective work organization, the payoff from which includes the best interests of employees and employers in equal measure."

Katzell et al. (1975) state that the individual's reactions to Q.W.L. at work can be that:

> A worker can be said to enjoy a high quality of working life when he (a) has positive feelings toward his job and its future prospects, (b) is motivated to stay on the job and perform well, and (c) feels his working life fits well with his private life to afford him balance between the two in terms of his personal values.

These advocates are concerned with the personal and economic security and

compensation of workers that is commensurate with their contribution to the value of the service or product. Q.W.L. includes a concern for procedural guarantees of opportunities for personal growth and craftsmanship, as well as the development of structured systems which insure that worker's ideas are listened to and taken into account in production.

Raymond Katzell et al. collected and analyzed research on Q.W.L. and worker productivity they followed up on every available study. Finally, they gleaned out one hundred and three as worthy for their presentation in their work on the effects of redesigning and humanizing work, on the quantity and quality of input and productivity output. It is disturbing to know that none of these studies were carried out by industrial educators or their advisees. Think about the issues and problems investigated by our graduate students. Did they deal with pedagogic concerns? Or did they address the national priority problem of industrial productivity? Why is it that the theme for our conferences have made attempts to create an association with technology for the space age etc., but now with the present state of crisis in national productivity we do not address the issue? Should we come out as an association to declare productivity as our objective of high priority? I would think so?

Berg (1978) and his associates have evidence that work redesign leads to high productivity when a total system method is used. When work design was made to focus on one part of the industrial system, i.e., where the problem was centered, improvements were reported, but these were not sustained over time. Many redesign efforts conducted by Masters of Business Administration focused in on the worker's role and behavior and management leadership styles. This, too, did not bring about sustained results. Berg specifically indicates that the total system starts with the product, then the determination of the technology, the manufacturing process to be used, and finally, the structure or design of the work organization. The last stages are heavily

curtailed by the first so it makes little sense to be primarily focusing only on the human resources part of the system.

Dr. Hisashi Shinto, production analyst from Japan, made the following assessment of the decline of productivity in the United States, (Washington Post April 10, 1983. "Young engineers attach themselves to management and the computer keyboard and not the shop. When American executives will return their engineers and intelligent workforce back to the shop floor within three or four years productivity and quality will go up."

The Committee on Science and Technology of the United States House of Representatives (1982) focused on making seven recommendations for research on ways of increasing productivity. Who will get involved with these? Will it be the social scientists and the psychologists who will take the leadership in industrial production technology while industrial education continues with pedagogical psycho-social research?

One of the recommendations of the Committee on Science and Technology suggests that educational and other agencies find ways to stimulate workplace innovation and process improvement. It also calls for finding ways for a commitment to cooperation between management and workers and that management look at their workers as a reservoir of intelligence and potential talent for productive ideas. It is this dimension, i.e., the mental skills for innovation productive thinking, that Industrial Arts should work to make visible and acceptable to industry. We need to reshape the image that others have of our activities. I call your attention to the Westinghouse ad in the National Science Teacher Association encouraging educators to guide youth away from the shop (Kirby, 1982). The image projected in this ad suggest that youth are wasting their talents in shop. How did this come about? One cause is the gap of communication. We do not produce ideas and return these to the disciplines and industries from which we draw our curriculum content. We inbreed our re-

search findings and theories. Evans in his writings (School Shop, April 83) wrote that, "Industrial Education and Industry cannot operate effectively without each other. A mutual symbiotic relationship means that each of the groups involved profits from the presence of others. Mutual symbiosis is different from parasitism. A parasite needs its host, but the host does not need the parasite." How many researchers from industrial education do you know that have given papers at conferences in anthropology, economics, engineering, psychology, social sciences or at least the American Educational Research Association? Our association needs to make it policy that those who publish or deliver papers espousing the value of industrial arts or their findings to other disciplines and organizations be recognized as significant contributors to the status of our discipline. Perhaps we can start by making a study to identify who contributed what to reach out and to give productive ideas in return. It is time to give back to the disciplines from which we have been drawing. We give recognition to our invited speakers but, we never pay tribute to our members who championed our contributions to other fields. If our graduates are not expected to, nor encouraged to deliver papers back to the fields they drew their knowledge from, we as teachers trainers are embracing a myopic view of scholarly productivity. As workers in industry are giving back, we too must give back to the sources from which we are drawing. The real challenge for us is to set new alliances with engineering and the physical sciences, math and the new technologies. We went overboard with our associations with the soft sciences and pedagogy.

Most of us here are aware of the various intervention strategies carried out in industry to improve productivity and job satisfaction of employees. The methods used are defined as: autonomous work groups, job restructuring, participative management, organizational behavior modification, flexible hours, and the Scanlon Plan. Evaluation studies of these methods or strategies always

reported success. However, no studies have ever conducted a research project using control groups nor were the unsuccessful ever reported. Some industrial management analysts believe there are more failures in the application of these methods than the reported successes. The studies performed were not done under scientifically controlled methods. Katzell believes that the studies and the reports are so flawed as to declare them unreliable .

One analyst, reporting in (MACAROV, p. 123), expresses his findings that few workers have either the desire for participatory management or believe that they have much to contribute to managerial decisions he also found that improvement in worker attitude and motivation, does not continue for sustained periods of time. Herein are more implications for setting new priorities for industrial education. There should be a thrust for research in methods of Q.W.L. and for strategies to develop the awareness and skills in youth necessary to function in the roles required in industry for improving productivity and the quality of the working life.

None of the Q.W.L. projects reported by Katzell set up experiments using workers for product development or planning. Nor did they consider providing a climate or direct expectation that product innovation or introduction was a dimension where workers could contribute to productivity.

As indicated in previous paragraphs, Berg and his associates, and Watson, place importance of all workers and management working together in generating ideas for product, technology, process and company structure. All these components are manifestations of ideas. The product also is a manifestation of an idea. Someone, some group, must take the responsibility for a new product program. To perpetuate itself a company needs to promote a goal, such as, "The goal of this company's innovative program is the regular systematic introduction and assimilation of acceptable new products into the existing operations."

Somewhere in the background of the American workforce there needs to be educational experiences which are designed to develop the skills of productive thinking. Students can be made conscious of their power to produce ideas, and their power to convert ideas to products which form the content of the man made world.

There are methods and activities that can build in people, a conviction of their ability to find within themselves the power and the confidence necessary to function in industry, and in activities, under the description of humanizing work and Q.W.L.

Many conference participants express the feeling that presentors of papers tend to be too hortatory. At this point you have been exposed to enough of exhortation, therefore, I turn to practical considerations.

I have gathered, and continue to gather, data to provide research evidence that people can be taught to make incremental improvements in their productive thinking abilities. Some data is gathered from my industrial consultation services and others from students within the university. I formulated a working, rather than a global, definition of productive thinking ability. It is a behavior distinguished by the capacity to produce a quantity of socially useful and unique solutions to problems that relate to reality at a given time within a given population. This definition contains measurable factors. The factor of quantity is the ability to produce a number of ideas in a given time; uniqueness is determined by the statistical infrequency of an idea of an individual within a group and the quality is determined by a specially weighted scale on a continuum of specifications. These factors are incorported into productive thinking training activities and into two validated measuring instruments. Other criteria served to made the instruments reliable and valid. These will appear in forthcoming publications dealing with the instrument for measuring productive thinking.

The workshops I give include the "Golden Touch Techniques." These are the Semantic Interdisciplinary and the Combination of Reality Factors Technique. Prior to using these techniques, lessons are given on the psychology of thinking. Thinking of all kinds -- critical, analytical, etc. are reviewed with examples. Efforts are made to remove different blocks which inhibit productive thinking and the facilitating forces are fostered. Criticism implied or explicit is totally banned and Roger's ( ) psychological conditions and attitudes during interactions to maximize free expression are practiced.

The data gathered up to this point tends to strongly support the hypotheses that productive thinking abilities can be incrementally improved by each participant, be it a person employed in industry or a student on campus. Because of these encouraging results and the position I take in this paper, there will be further research involving industry and resulting articles will be offered to industrial journals and publishers in our field and hopefully they will be influential to start a new thrust for I.A. to help in our national crisis of worker productivity.

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